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13. SUPPLEMENTARY NOTES

14. ABSTRACT

The requested photobioreactors were purchased and are operational.
We have so far used the photobioreactors for the following purposes in the context of our AFOSR YIP grant, which aims to identify the genes required for photosynthesis in green algae: 1) Characterized the growth rates of wild-type under different light intensities, 2) Demonstrated our ability to measure growth rates in a pool of 2,000 mutnats, 3) Ran a proof-of-concept screen of 20,000 mutants.

15. SUBJECT TERMS

Photobioreactors, photosynthesis, Chlamydomonas, mutants

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Final report for Grant Number FA9550-11-1-0325

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The requested photobioreactors were purchased and are operational.

The photobioreactors have so far enabled the following endeavors in the context of our AFOSR YIP grant FA9550-11-1-0060 entitled "Novel genetic tools to accelerate our understanding of photosynthesis and lipid accumulation", which aims to identify the genes required for photosynthesis in green algae:

1) Characterized the growth rates of a Chlamydomonas wild-type strain as a function of different light intensities.

2) Tested our ability to quantitatively measure growth rates in pools of mutants. The results indicate that we can very quantitatively measure growth rates in pools of ~2,000 mutants.

3) Ran a proof-of-concept screen to identify genes required for photosynthesis in the green alga Chlamydomonas. ~20,000 mutants were screened, representing ~50% of all genes in the genome. This effort revealed the distribution of insertion sites throughout the Chlamydomonas genome. However, we ran into problems with quantifying growth rates, due to the wide range in mutant abundances at the start of the growth rate measurements (a small number of mutants took over the majority of the population before the start of the experiment). Based on these results, we are modifying our approach to yield better data in the next round.